Scott . . . where innovation is a tradition

SCOTT

SERVICE MANUAL FOR MODEL 3141

SPECIFICATIONS

TUNER (FM-MPX)

Usable Sensitivity (IHF)	2.0 microvolts
Cross Modulation Rejection	80 db
Signal to Noise Ratio	below 100% modulation 60
Total Harmonic Distortion	0.8%
Frequency Deviation (Drift)	0.02%
*Frequency Response	30 to 15,000 Hz ± 1 db
Capture Ratio	2.5 db
Selectivity	42 db
Tuning Range	87 to 108 mc
Accuracy of Calibration	0.5%
Separation	40 db or more
FM & IF Limiting Stages	9

*This is limit of FCC Stereo Broadcast specifications. All H. H. SCOTT tuners have far wider frequency response.

TAPE OUTPUT

Rated Voltage Output to Tape Recorder	0.5 v
Minimum Recommended Load Resistance	47 k ohms

PRE-AMPLIFIER

Input:

Tape Head - Input Impedance	47 k ohms
Signal for Rated Output	3 mv
S/N Ratio	60 db
Phono-Input Impedance (All Switch Positions)	47 k ohms
High Level Inputs - Input Impedance	60 k ohms
Signal for Rated Output	75 db
S/N Ratio	80 db
Frequency Response in Flat Position	18-25 khz 1.0 db
Treble Controls Measured at 10,000 Hz, Boost & Cut	10 db ± 2 db
Bass Controls Measured at 30 Hz, Boost & Cut	12 db ± 2 db
Scratch Filter	-6 db/octave: -3 db @ 5 k Hz
Loudness Compensation (maximum)	+ 12 db @ 50 Hz
Loudness Compensation	+ 4 db @ 10 k Hz

AMPLIFIERS

Power Ratio (watts per channel)	
@ 0.8% Harmonic Distortion	
@ 4 ohms	32.5 watts
@ 8 ohms	25 watts
Continuous Output Single Channel	
@ 8 ohms, 0.8% Harmonic Distortion	18 watts
Continuous Output Both Channels	
@ 8 ohms, 0.8% Harmonic Distortion	18 watts

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3141 AUDIO SECTION

Total Harmonic Distortion	0.8%
Frequency Response	18-25,000 ± 1 db
Power Bandwidth at Rated Distortion (IHF Method)	25-20,000 Hz
Hum and Noise (Phono)	-55
Range of Line Voltage and Frequency	105-120v, 50-60 Hz
Power Consumption - 117 v at 60 Hz (AC only)	25-95 watts

EQUIPMENT NEEDED

Audio Oscillator
VTVM
Oscilloscope
VOM
Load Box
Attenuator
Distortion Meter
Variac
AC Supply Fixture

Set Controls to the Following:

Input Selector	Extra
Stereo Switch	Stereo
Tone Controls	Flat "O"
Loudness	Min.
Stereo Bal. Sw.	Norm.
Noise Filter	OUT
Speaker Switch	ON
Power Switch	OFF

1. Bias and Balance Settings and Voltage Checks

Turn unit on - watch carefully for any signs of voltage shorts. With bias pots (1K) still full ccw (from top of unit), check supply for 48 to 50. Adjust bias pots for 0.8 mA current from each test point in the rear of the unit to ground.

Check power supply board	for 25V ±10%
Check power supply board	for 12V ±10%

2. Sensitivity Check

Audio osc. to EXTRA at .3V (+2 dB) input. Connect 8 ohm load to main speaker taps. Turn loudness pot to max., observe output of 18 watts (12V). Check tape output jack with troubleshooting lead for same output as signal.

3. Distortion Check

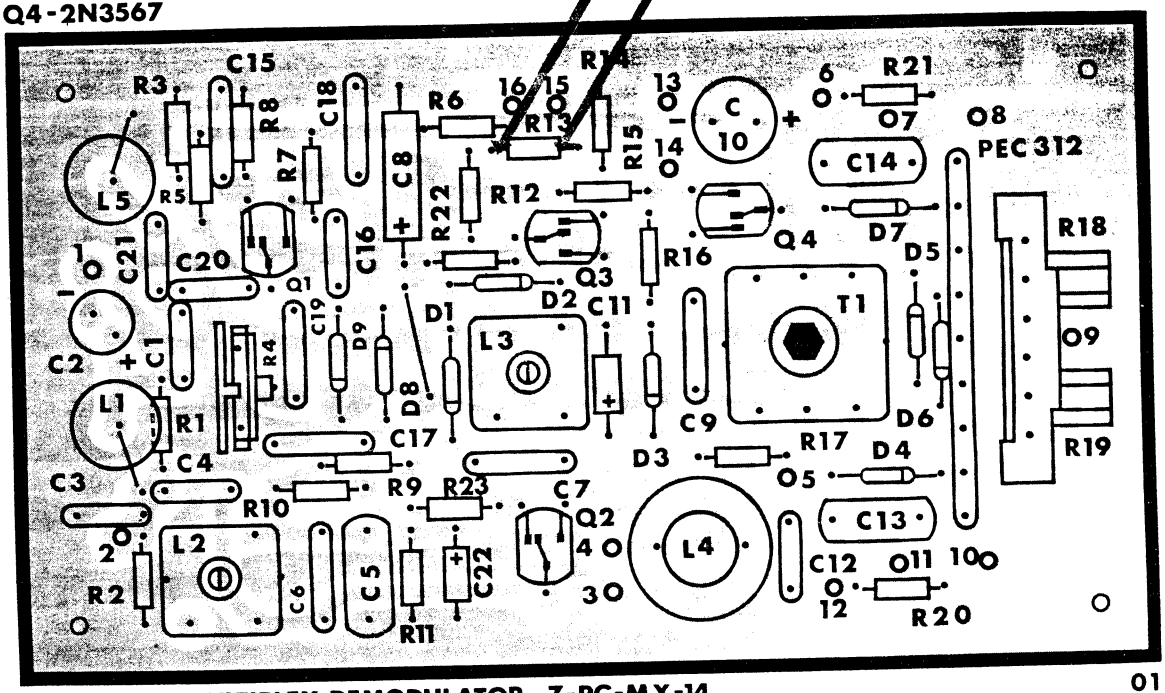
At 12V output max. distortion 0.6%.

4. Tape Monitor Switch Check

Audio osc. to EXTRA at .3 input to L channel. Note output at left channel speaker terminal. Put tape monitor switch in the IN position. Note loss of output. Connect input cable from L channel tape out to L channel tape in. Note restoration of signal out. Repeat process for R channel, then return tape monitor switch to out position.

Q1- 2N2924
Q2- 2N2925 or SE4010 or QA-15
Q3 -2N3964 or 2N4249 or 2N4250
Q4 -2N3567

STEP A & B OF MULTIPLEX ALIGNMENT



AUTOMATIC MULTIPLEX DEMODULATOR Z-PC-MX-14

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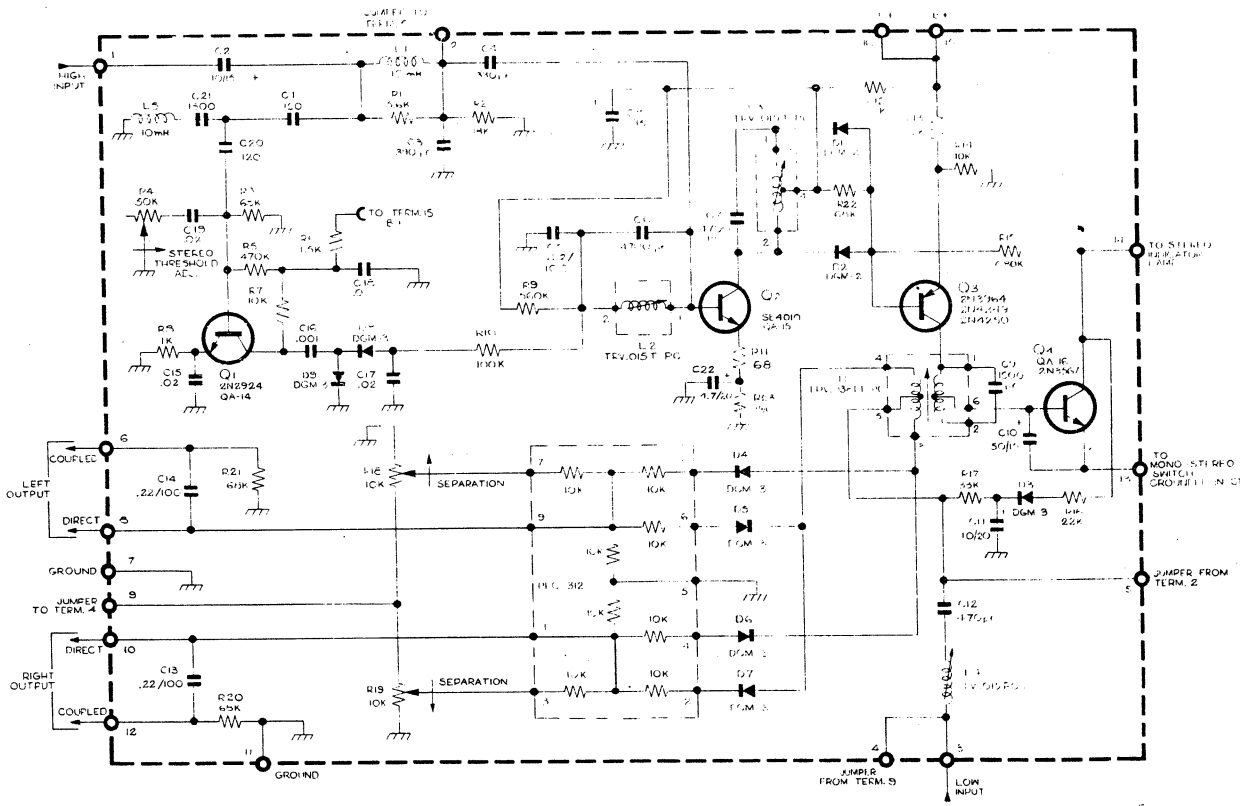
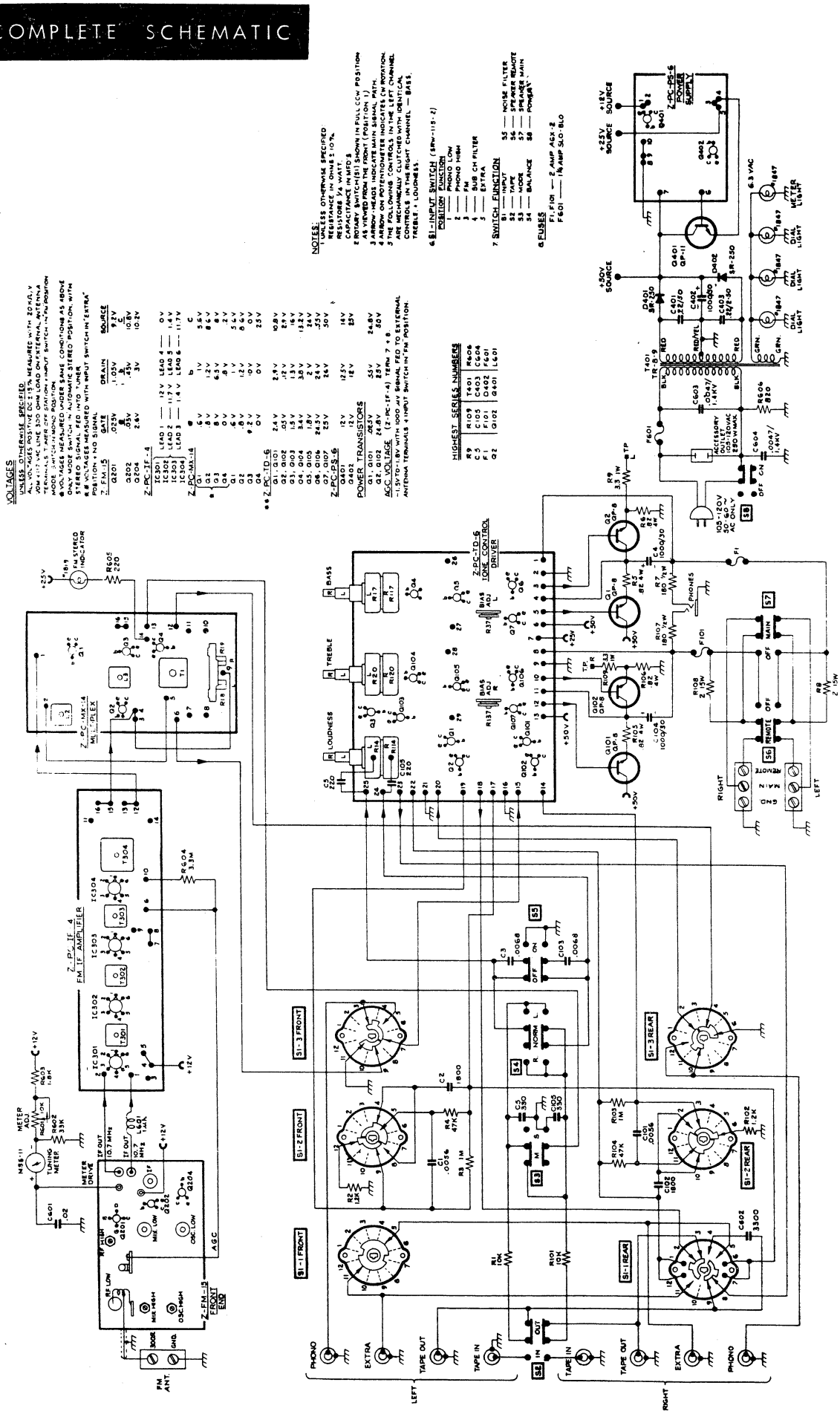


AUTOMATIC MULTIPLEX DEMODULATOR Z-PC-MX-14

NOTES:
1. UNLESS OTHERWISE SPECIFIED: RESISTANCE IN OHMS ±10%
CAPACITANCE IN MFD'S. RESISTORS ¼ WATT.
2. ARROWS ON POTENTIOMETERS INDICATE CW ROTATION.

3141 COMPLETE SCHEMATIC



3141 TUNER-FM SECTION

EQUIPMENT NEEDED

VTVM
Oscilloscope
VOM
Distortion Meter
FM Generator
MX Generator
Audio Generator

Set Controls to the Following:

Separation Pots	Max CW
Input Select. Switch	FM

1. Mono Alignment and Sensitivity Check

Front End and IF Alignment

With about 10 uv generator output, align and peak front end for max. output. With 3 uv input, align IF's for max. audio. With 1 or 2 K uv input, align detector for minimum distortion.

2. Sensitivity and Distortion

Measure sensitivity of tuner with 3 uv RF input. Must obtain 30 dB usable sensitivity at 92, 98, and 106 mc. Recheck distortion, 2K uv input. 400 Hz- max. distortion of 0.8%.

3. FM Hum Check

Tune to 91.5 mc, measure min. of 60 dB (AC plug may be reversed).

De-emphasis Check

Tune to 90 mc (change modulator to 8 KHz), note decrease of 12 $\pm$ dB in output.

Calibration Check

Check calibration against stations - max. tolerance $\pm$2 mc.

4. Multiplex Alignment - Unit to Stereo

a) Pilot Adjustment - Scope probe (Low - Cap) to test point at base of Q3, peak L2 and L3 for max. pilot. With VOM, measure 2.5 to 3.5 dc across 2.2K resistor in the emitter of Q3.

b) With VOM across 2.2K resistor carefully tune L2 & L3 for max., then tune T1 for dip.

c) Separation Adjustment - Output from Ch. A. Adjust scope to obtain pattern and adjust L2 for min. output observing scope. Adjust A separation pot for min. output. Tuner output from Ch. B and adjust B separation pot for min. as outlined above. Repeat between A & B until no further improvement is seen.

d) Final separation measurements to be done in each channel:

Audio Modulation	Minimum Separation
400 Hz	30 dB

If separation specs are not met, recheck IF's for proper alignment. Also recheck steps 4.b) and 4.c)

e) Stereo Switchover Check

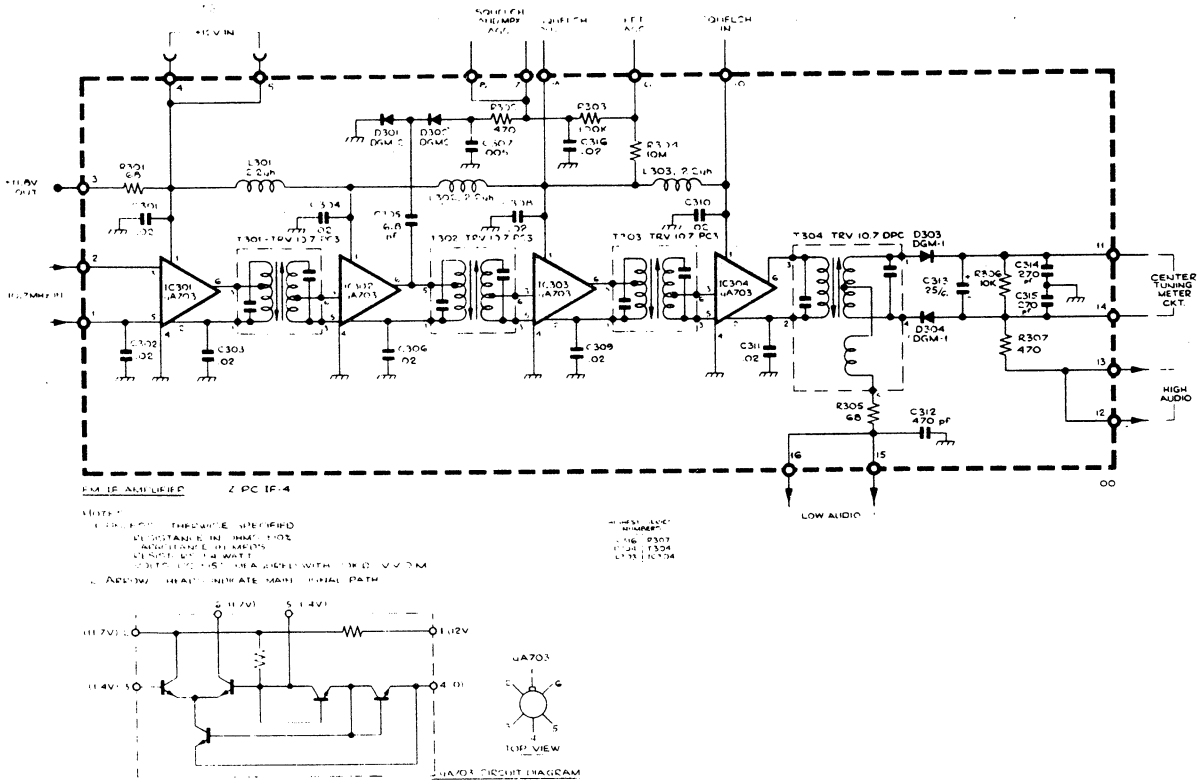
Check switchover point (at generators), min. 10 uV, max. 30 uV. Switchover may be adjusted by threshold pot on MX board.

f) Final Listen Check

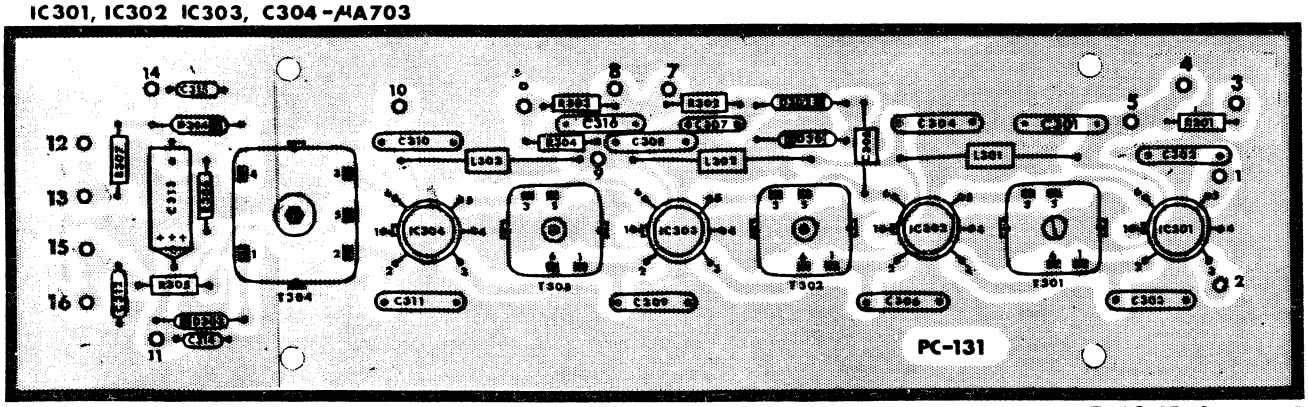
Check all inputs and outputs (including phone jacks), switches and controls for proper operation. Check overall appearance and scrap inside unit. Check for proper switching of stereo light. Check calibration against stations specs are $\pm$0.2 mc.

TROUBLESHOOTING PROCEDURE FOR IC-IF-4

3141 ONLY



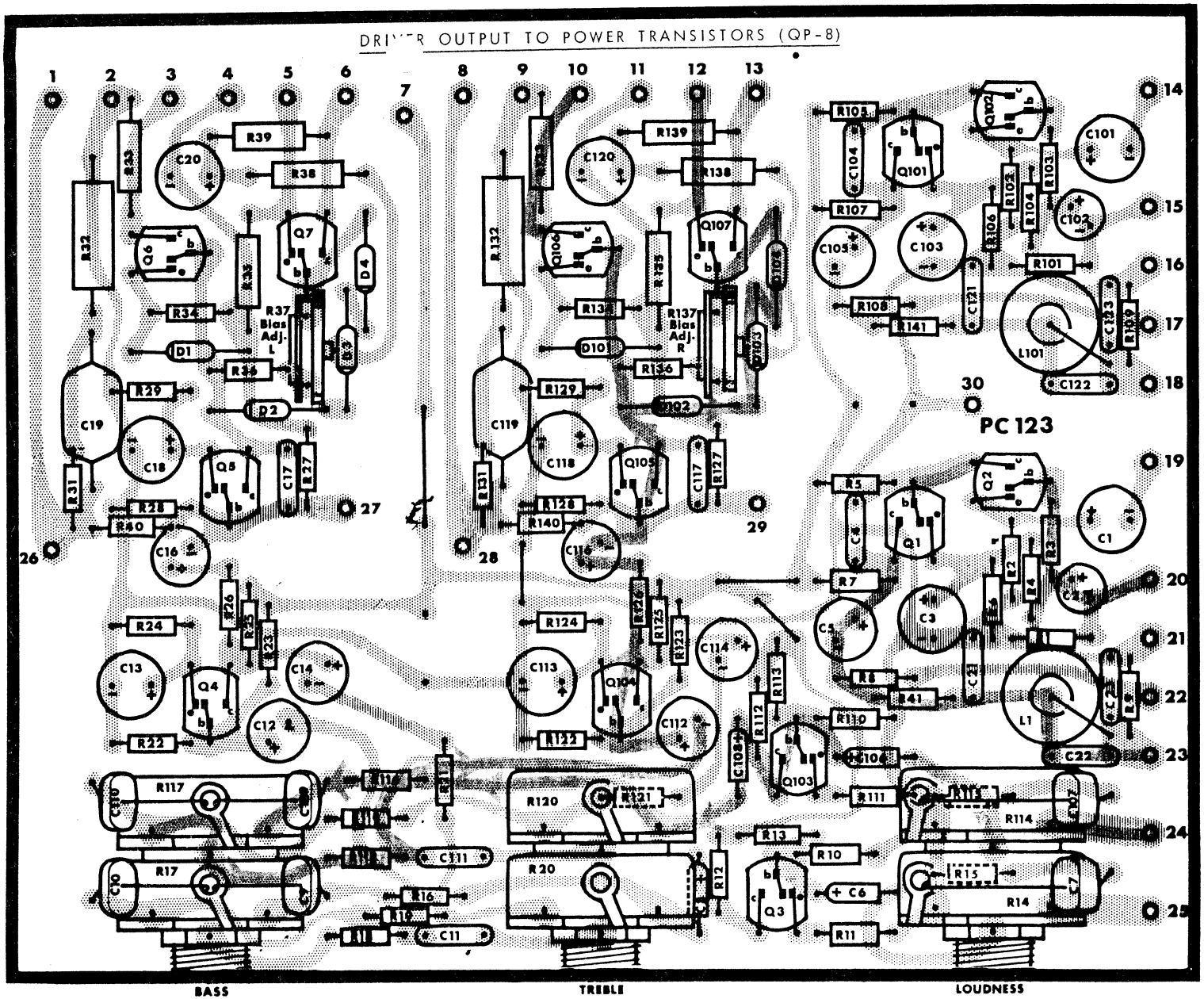
IC301, IC302 IC303, C304 - μA703



FM I.F. AMPLIFIER **Z-PC-IF-4** 1

VOLTAGE CHECKS (UA703)

Pin 1	B+ 12 Volts
Set VOM on 3 volt scale:	positive lead of meter on pin 1, negative lead on pin 2 and/or pin 6. If voltage is apparent, then that particular stage of IC is operating normally
No output or distortion Meter operates okay	check diodes D303 and D304 for defect
Meter pegging either direction	defective D301 or D302



Q1 Q101 — QA-14
Q2 Q102 — QA-12
Q3 Q103 Q4 Q104 — QA-14
Q5 Q105 — QA-16
Q6 Q106 — QA-11
Q7 Q107 — QA-10

TONE CONTROL - DRIVER Z-PC-TD-6

LINE SHOWS SIGNAL PATH THRU AUDIO SECTION OF UNIT (RIGHT CHANNEL)

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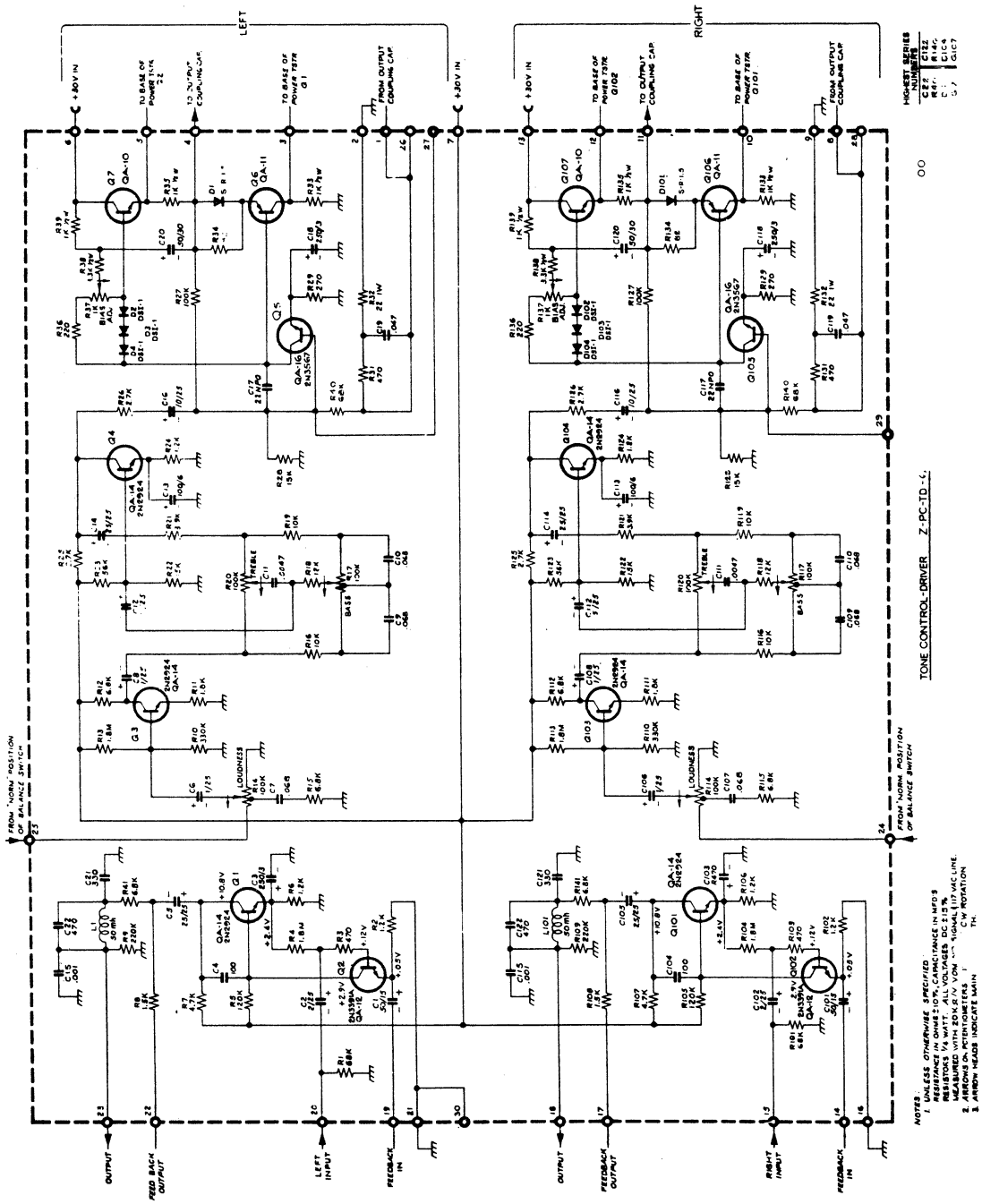
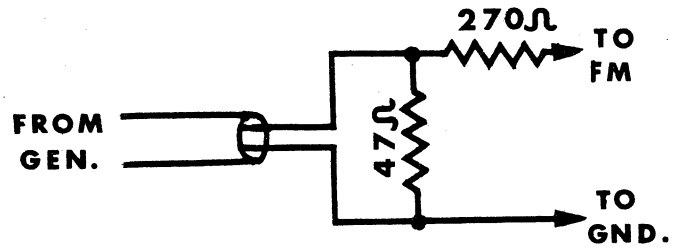
PRE AMP-TONE CONTROL-DRIVER

PRE AMP-TONE CONTROL-DRIVER



FM FRONT END ALIGNMENT FOR 3141 FM SECTION

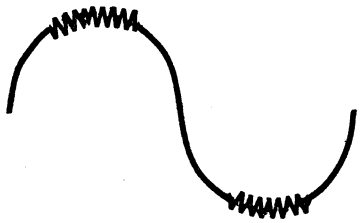
1. Connect RF generator to the antenna terminals with the following adaptations:



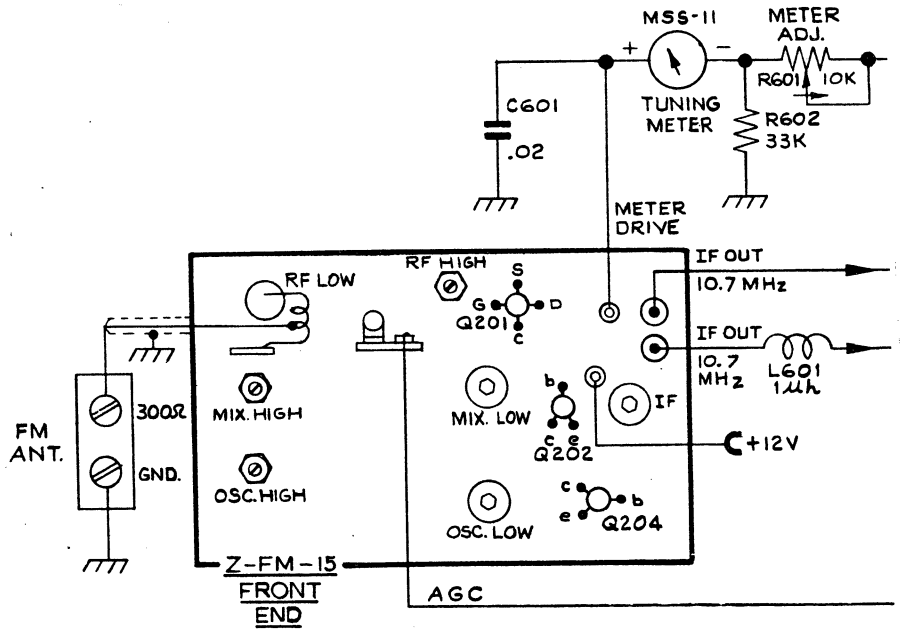
2. Set RF generator and FM tuning dial to 92 mHz. Generator output should be about 6 uv. Peak L205, L204 and L201 for maximum audio output.

3. Set generator and FM tuning dial to 106 mHz. Peak RF trimmer and mixer trimmer.

4. With about 3 uv from FM generator, repeat procedure until no further output is obtained. Signal should look like this:

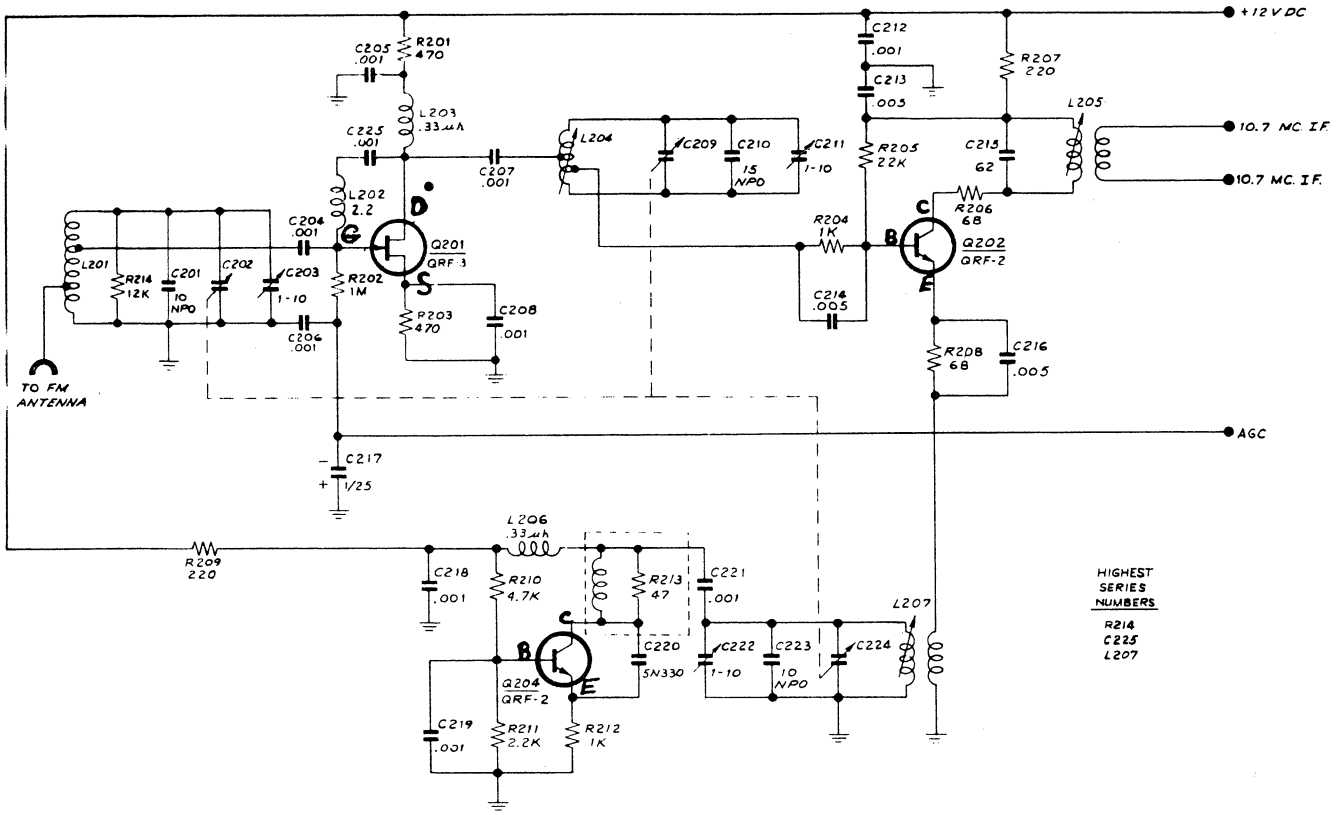


5. The only time that the oscillator mixer and trimmer should be touched is if the calibration is out of specification.



Mechanical layout of Front Ends denoting, Oscillator, Mixer, Antenna Coils and Voltages present under normal operating conditions

3141



3141

All voltages measured with 20,000 ohm/volt VOM; 300 ohm antenna and no signal.

Q201		Q202		Q204	
G	.025	B	.45	B	3
D	9.2	E	.05	E	2.6
S	1.05	C	10.8	C	10.2

Troubleshooting Guide

Trouble	Possible Remedy
Low gain	Replace Q201
No Output	Open LRFC 2.2 or .33 defective Q201, Q202, Q204

5. Speaker Switch & Phone Jack Check

Speaker switch to OFF position. Note complete loss of signal. Loudness to min. Insert phone plug to phone jack, remove speaker leads, and connect to phone plug leads. Loudness to max. Note drop of 26 ± dB. Switch main speakers in, note restoration of signal. Switch to remote speaker position on speaker taps and speaker switch. Note drop in output of 1 to 2 dB. Speaker switch off, note loss of signal. Return speaker switch to main position and load to main speaker taps.

6. Loudness Volume Check

Loudness pot to #4 flat, osc. to 1 kHz. Take reference. Osc. to 100 Hz. Note rise of 7dB ±2. Switch osc. to 10 kHz. Note rise of 0 ±2 dB. Loudness pot to max. Osc. 1KHz output 12V. Loudness to min., drop of 70 dB. Loudness pot to max.

7. Tracking Check

In . dB steps check tracking of L & R channels, output may be no more than 3 dB between channels down to 40 dB down.

8. Crosstalk and Stereo Switch Check

At 1 kHz turn loudness pot to 10 flat, output to 12V, mono-stereo switch to stereo, bal switch to bal. left. Note drop of 0 dB. Bal. switch to bal. right. Note additional drop of 50dB. Return controls to previous settings. Loudness pot to max., attenuate to 0 dB on 1V range.

9. Tone Control Check (0dB 1V range)

Bass 100 Hz		Treble 10 kHz	
Boost	- 10 dB ±2 dB	Boost	- 10 dB ±2 dB
Cut	- 15 dB ±2 dB	Cut	- 10 dB ±2 dB

10. Frequency Response Check

Osc. 0 dB 1 kHz reference on 1V range. Sweep osc. from 35 Hz to 20 kHz, note maximum variation of ±2 dB. 3 dB down point 20 Hz or lower
3 dB down point 30 kHz

11. Regulation Check

At 1kHz 0 dB 1 V range remove 8 ohm load switch. Output rise of 1dB max.

12. Noise Filter Check

At 5 kHz noise filter IN. Note 4 dB drop in output ±2 dB.

13. Preamp Gain Check @1 kHz

Attenuate input 35 dB, input leads to phono low. Output 0 dB 1V range ±1 dB. Stereo mono switch to mono, note drop of 7 dB in output. Stereo mono switch to stereo. Input selector switch to phono - high, note drop of 7 dB. Input selector switch back to phone - low, output 0 dB 1V range.

14. Preamp Frequency Response Check

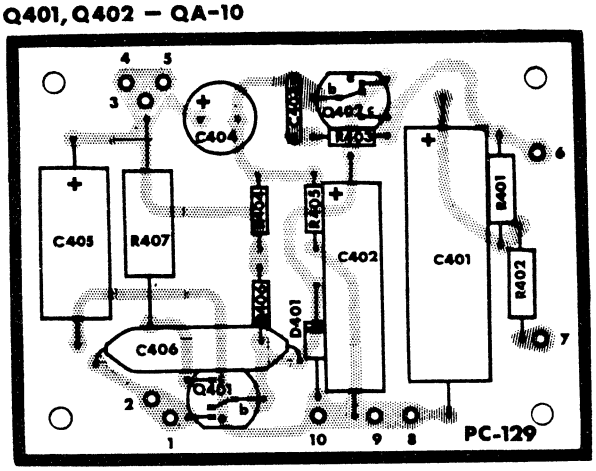
1 kHz	0dB (ref)
10 kHz	-12 ±2 dB
100 kHz	+13 ±2 dB

15. Hum Checks (all inputs shorted)

Position	Loudness Pot	Max Hum
Extra	0	3 mV
Extra	10	5 mV
Phono High	10	30 mV
Phono Low	10	30 mV

16. Repeat steps 2 through 15 for R channel.

Q401, Q402 – QA-10



POWER SUPPLY Z-PC-PS-6 00